REMARKS

Claims 1, 2 and 11-20 are pending. Claims 3-10 have been canceled without prejudice to filing the subject matter in a continuation application.

Claim 1 has been amended to incorporate the feature of original claim 2 and to further define the retardation values of the optically anisotropic member (A) and optically anisotropic member (B). The amendment to claim 1 is supported by page 51, line 3 bridging to page 52, line 2 and Fig. 3, page 52, lines 14 to 16 and page 50, lines 5 to 23 of the present specification. Claim 1 thus amended corresponds to the first embodiment of the present invention and another embodiment in which the polarizer of the incident side in the first embodiment is placed at the side of the back light and the polarizer of the output side in the first embodiment is placed at the vision side.

Claim 2 was re-written in independent form and is directed to a liquid display apparatus of the second embodiment of the present invention and another embodiment in which the polarizer of the incident side in the first embodiment is placed at the side of the back light and the polarizer of the output side in the first embodiment is placed at the vision side. The amendment to claim 2 is supported by page 52, line 24 bridging to page 53, line 18 and Fig. 4, page 54, line 5 and page 50, lines 5 to 23 of the present specification.

New claims 13 and 14 define the relative positions of anisotropic members (A) and (B) with respect to the liquid crystal cell. The subject matter of claim 13 finds support at page 51, lines 24 to 25 of the present specification and the subject matter of claim 14 finds support at page 53, lines 14 to 15 of the present specification.

New claim 15 is directed to a liquid crystal display device in which optically anisotropic member (A) comprises an oriented layer of a laminate having a layer

comprising material having a negative value of intrinsic birefringence and a layer comprising other materials laminated to at least one face of said layer comprising the material having a negative value of intrinsic birefringence. This is supported by page 14, lines 12 to 15 of the present specification.

New claim 16 is directed to a liquid crystal display device in which optically anisotropic member (A) is obtained by stretching the laminate described in claim 15. This is supported by page 16, lines 18 to 26 of the present specification.

New claim 17 is supported by page 15, lines 10 to 20 and page 64, lines 1 to 14 of the present specification.

New claims 18 to 20 are supported by page 14, lines 20 to 22 of the present specification.

No new matter has been added by way of the above-amendment.

I. Prior art based issues

The following prior art based rejections are pending:

(A) Claims 1-11 are rejected under 35 U.S.C 102 (b) as anticipated by Itakura et al (US Pregrant Publication 2003-0122991); and

(B) Claim 12 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Itakura et al.

Applicants respectfully traverse Rejection (A) and Rejection (B).

Applicants respectfully submit that the presently claimed liquid crystal display device is neither taught nor fairly suggested by Itakura et al. Briefly speaking, the liquid crystal display device of the present claim 1 has one of the following configurations:[1]

Configuration (1)

PI/ ANISOTROPIC (B)/ ANISOTROPIC (A)/LCC/PO or

PI/ ANISOTROPIC (A)/ ANISOTROPIC (B)/LCC/PO,

wherein

(i) ABSNAX of PO and the IPSAX of the LC of LCC under application of no voltage are parallel to each other,

(ii) the IPSAX of ANISOTROPIC (A) and IPSAX of ANISOTROPIC (B) is approximately parallel to each other,

(iii) IPSAX of ANISOTROPIC (B) and IPSAX of the LC of LCC under application of no voltage are approximately parallel to each other,

or

[1] Herein the following abbreviations are used for convenience:
ABSNAX: Absorption slow axis
ANISOTROPIC: Optically anisotropic member
LC: Liquid crystal
LCC: Liquid crystal cell
PI: Polarizer at incident side
PO: Polarizer at output side

Configuration (2)

PI /LCC/ ANISOTROPIC (A)/ ANISOTROPIC (B)/PO or

PI /LCC/ ANISOTROPIC (B)/ ANISOTROPIC (A)/PO,

wherein

(i) ABSNAX of PI and the IPSAX of the LC of LCC under application of no voltage are parallel to each other,

(ii) IPSAX of ANISOTROPIC (A) and IPSAX of ANISOTROPIC (B) are approximately parallel to each other,

(iii) IPSAX of ANISOTROPIC (B) and IPSAX of the LC of LCC under application of no voltage are approximately parallel to each other.

In addition to above, an in-plane retardation Re(A), a retardation in the direction of the thickness R_{th} (A) of ANISOTROPIC (A), and an in-plane retardation R_e(B), a retardation in the direction of the thickness R_{th}(B) of ANISOTROPIC (B) of the liquid crystal display device of the present claim 1 satisfy the following formulae:

$70 \leqq R_e(A) \leqq 120$,

$-65 \leqq R_{th}(A) \leqq -25$,

$50 \leqq R_e(B) \leqq 110$ and

$25 \leqq R_{th}(B) \leqq 70$,

wherein the parameters in the formulae are as defined in claim 1.

In addition, the liquid crystal display device of the present claim 2 has one of the following configurations:

Configuration (1)

PI/ ANISOTROPIC (A)/ ANISOTROPIC (B)/LCC/PO or

PI/ ANISOTROPIC (B)/ ANISOTROPIC (A)/LCC/PO,

wherein

(i) ABSNAX of PO and the IPSAX of the LC of LCC under application of no voltage are parallel to each other,

(ii) the IPSAX of ANISOTROPIC (A) and IPSAX of ANISOTROPIC (B) is approximately parallel to each other,

(iii) IPSAX of ANISOTROPIC (B) and IPSAX of the LC of LCC under application of no voltage are approximately perpendicular to each other,

or

Configuration (2)

PI /LCC/ ANISOTROPIC (A)/ ANISOTROPIC (B)/PO or

PI /LCC/ ANISOTROPIC (B)/ ANISOTROPIC (A)/PO,

wherein

(i) ABSNAX of PI and the IPSAX of the LC of LCC under application of no voltage are parallel to each other,

(ii) IPSAX of ANISOTROPIC (A) and IPSAX of ANISOTROPIC (B) are approximately parallel to each other,

(iii) IPSAX of ANISOTROPIC (B) and IPSAX of the LC of LCC under application of no voltage are approximately perpendicular to each other.

In addition to above, an in-plane retardation Re(A), a retardation in the direction of the thickness $R_{th}(A)$ of ANISOTROPIC (A), and an in-plane retardation $R_e(B)$, a retardation in the direction of the thickness $R_{th}(B)$ of ANISOTROPIC (B) of

the liquid crystal display device of the present claim 2 satisfy the following formulae:

$30 \leqq R_e(A) \leqq 150,$

$-90 \leqq R_{th}(A) \leqq -15,$

$40 \leqq R_e(B) \leqq 150$ and

$20 \leqq R_{th}(B) \leqq 75,$

wherein the parameters in the formulae are as defined in claim 2.

Applicants respectfully submit that the presently claimed liquid crystal display device of claims 1 and 2 is neither taught nor fairly suggested by Itakura et al.

Itakura et al. disclose:

> [A]n in-plane switching active matrix liquid crystal display with greater improvements on color shifting and contrast. The liquid crystal display device comprises an in-plane switching type liquid crystal panel having an active device substrate, an opposing substrate and a liquid crystal layer held sandwiched between the active device substrate and the opposing substrate, a first polarizer laid out on one side of the liquid crystal display panel, a second polarizer laid out on the opposite side of the liquid crystal display panel, first to third optical compensators placed in order between the liquid crystal display panel and the first polarizer, and a fourth optical compensator placed between the liquid crystal display panel and the second polarizer. (ABSTRACT of Itakura et al.)

In Itakura et al., four embodiments with some examples of each of the embodiments are disclosed. Of these embodiments, only the third embodiment of Itakura et al. is similar with the presently claimed inventions in that two optical compensators are disposed between a liquid crystal layer and a polarizer and no optical compensator is disposed between the liquid crystal layer and another polarizer. However, Itakura et al. fail to disclose that the retardations (nx-ny)d of the compensators which correspond to Re(A) and Re(B) in the present claims 1 and 2 should satisfy the following formulae:

$70 \leqq R_e(A) \leqq 120$ and $50 \leqq R_e(B) \leqq 110$ (present claim 1) or

$30 \leqq R_e(A) \leqq 150$ and $40 \leqq R_e(B) \leqq 150$ (present claim 2).

Itakura et al. disclose in claim 31 (which corresponds to the third embodiment of their invention) that the retardation (nx-ny)d of the first optical compensator is within a range of -150 to -500 nm and the retardation (nx-ny)d of the second optical compensator which corresponds to $R_e(B)$ of the present invention is within a range of 250 to 450 nm. As defined in present claims 1 and 2, n_{xA} and n_{xB} are the refractive indices in a direction of in-plane slow axis. Therefore, in the present claims 1 and 2, there is no possibility that the values, $n_{xA}-n_{yA}$ or $n_{xB}-n_{yB}$ are negative.

In contrast, Itakura et al. do not specifically define that the direction of nx is a direction of an in-plane slow axis of an anisotropic member. When the value, nx-ny of optical compensator of Itakura et al. is negative, it means that the in-plane slow axis of the compensator is in the direction of ny instead of nx. Therefore, when (nx-ny)d is a negative value in Itakura et al., the in-plane retardation Re as defined in the present invention can be calculated by the following equation:

Re = (ny - nx)d.

Stated differently, a retardation, (nx-ny)d having a negative value in Itakura et al. can be converted to the in-plane retardation (Re(A) or Re(B)) as defined in present claims 1 and 2 by deletion of minus sign (i.e., by taking the absolute value of the number). The range of (nx-ny)d disclosed in claim 31 of Itakura et al. or (ny-nx)d converted to a positive values all fall out of the range of Re(A) or Re(B) as defined in claims 1 or 2. The actual values of retardations shown in Examples 1-1 to 1-4 and 2-1 to 2-2 of the third embodiment disclosed in Itakura et al. also all fall out of the range of Re(A) or Re(B) as defined in claims 1 or 2. Thus, Itakura et al. fail to teach or suggest one of important feature of the present claims 1 and 2.

Furthermore, although Itakura et al. teach a relation of the directions of refractive indices nx of the first and the second optical compensators with respect to the direction of the liquid crystal layer (please see [0015] to [0018], [0075], [0078], [0080], [0082] and FIG. 13B, [0086], [0088] and FIG. 16B of Itakura et al.), Itakura et al. fail to teach or suggest specifically a relation between the directions of in-plane slow axes of the first and the second optical compensators. In contrast, the in-plane slow axes of optically anisotropic members (A) and (B) are parallel in present claims 1 and 2. Thus, Itakura et al. fail to teach two important features of the present claims 1 and 2. It is therefore submitted that Itakura et al. do not anticipate the subject matter of present claims 1 and 2.

In addition to the arguments set forth above, Mr. Mitsuhito Hirota of the assignee conducted a supplemental experiment by computer simulation in order to prove the unexpected results of the presently claimed inventions as claimed in present claims 1 and 2 as described in the attached DECLARATION UNDER 37 CFR 1.132.

Before comparing the disclosure of Itakura et al. and the subject matter of the presently claimed invention, it is necessary to confirm the difference in the parameters disclosed in Itakura et al. and those of presently claimed invention, particularly with respect to the direction of in-plane slow axis, and the value of retardation in the direction of thickness. As discussed above, Itakura et al. do not specifically define the direction of in-plane slow axis of the optical compensators. Therefore, retardations (nx - ny)d having a negative value should be converted to a positive value by deletion of minus sign (i.e., taking the absolute value of the number). Another difference in defining a parameter is a manner of defining the value of retardation in the direction of thickness. In the present invention, the

retardation in the direction of thickness, $R_{th}(A)$ and $R_{th}(A)$ are defined as follows:

$R_{th}(A) = [(n_{xA} + n_{yA})/2 - n_{zA}] \times d_A$ and

$R_{th}(B) = [(n_{xB} + n_{yB})/2 - n_{zB}] \times d_B$.

In Itakura et al., however, another parameter: (nx-nz)/(nx-ny) is defined instead of $R_{th}(A)$ and $R_{th}(B)$ in the present claims 1 and 2. For convenience, this parameter is referred to herein as "Nz", namely:

$$Nz = (nx-nz)/(nx-ny).$$

However, these parameters $R_{th}(A)$ or $R_{th}(B)$ and Nz can easily be converted mathematically to each other by the following relations:

$Nz = (nx-nz)/(nx-ny) = (R_{th} / R_e)+0.5$ or

$R_{th} = R_e(Nz-0.5)$

by abbreviating suffixes A or B in R_{th} and R_e, when (nx-ny) is positive. It is further noted that there is a case in Itakura et al. where nx-ny < 0 whereas $n_{xA}-n_{yA}$ or $n_{xB}-n_{yB}$ should be always positive in the present claims 1 and 2. When nx-ny < 0, the direction of ny is a direction of in-plane slow axis. Therefore, in order to calculate R_{th} corresponding to the definition of the present claims 1 and 2 from Nz value disclosed in Itakura et al, above equation should be rewritten by replacing nx with ny and ny with nx, respectively, and it follows through a simple mathematical conversion that

$Nz' = (ny-nz)/(ny-nx) = 1 - Nz$ or

$R_{th}' = R_e'(0.5-Nz)$

wherein Nz' represents the converted value calculated from nx-ny and Nz in Itakura et al., R_{th}' represents the converted value of retardation in the direction of thickness and $R_e' = -(nx-ny)$.

In the Supplemental Experiments in the Declaration, an omni-directional

contrast of each of the liquid crystal display devices disclosed in Inventive Examples 1 to 5 of the present specification was obtained by computer simulation as summarized in Table 1. The parameters of the LCD devices of Inventive Examples 1-5 are each within the scope of present claims 1 and 2. The LCD devices of Inventive Examples 1-5 are shown in Fig. 9 of the Declaration which is reproduced hereinbelow for the Examiner's convenience:

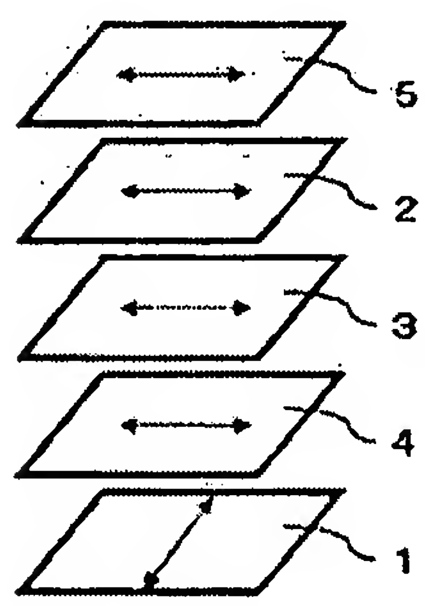

Figure 9 of Declaration (equivalent to Fig 8 of present specification)

1 polarizing plate,
2 liquid crystal cell,
3 optical anisotropic member (A),
4 optical anisotropic member (B), and
5 polarizing plate.

As shown by the data of Table 1, the omni-directional contrast was 65 or more even in the liquid crystal display device of Inventive Example 2 which exhibited the smallest effect for improving contrast.

In contrast, Comparative Example 2 in Table 2 show data (obtained by a simulation conducted based on essentially the same conditions as that shown in Table 1) for the liquid crystal display of the THIRD EMBODIMENT disclosed in Itakura et al. which is similar to an embodiment of the presently claimed invention

in that two optical compensators are disposed between a liquid crystal layer and a polarizer and no optical compensator is disposed between the liquid crystal layer and another polarizer. The THIRD EMBODIMENT is shown in Fig 10 of the Declaration (which is equivalent to the Fig. 13 B of Itakura et al.). Fig. 10 of the Declaration is reproduced below for the Examiner's convenience.

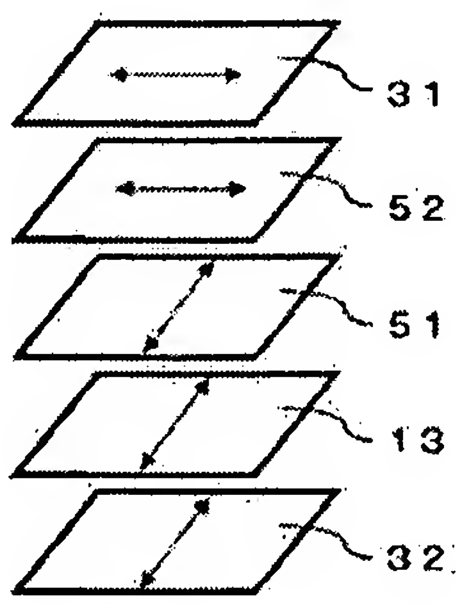

Fig 10 of the Declaration (which is equivalent to the Fig. 13B of Itakura et al.)

liquid crystal layer 13
first polarizer 31
second polarizer 32
first optical compensator 51
second optical compensator 52

The omni-directional contrast of Comparative Example 2 having a similar construction as in the THIRD EMBODIMENT of Itakura et al. was 42 or more which is remarkably inferior as compared to the value 65 or more in Inventive Example 2 as set forth above. The difference in contrast of at least 23 is a prominent advantage of the presently claimed invention over Itakura et al. and is of a magnitude as to be unexpected by one skilled in the art.

Of the embodiments of Itakura et al. which were evaluated, it was found that the best construction for producing omni-directional contrast of all of the Examples in Itakura et al. by simulation was EXAMPLE 1 OF FIRST EMBODIMENT, which

has the following construction.

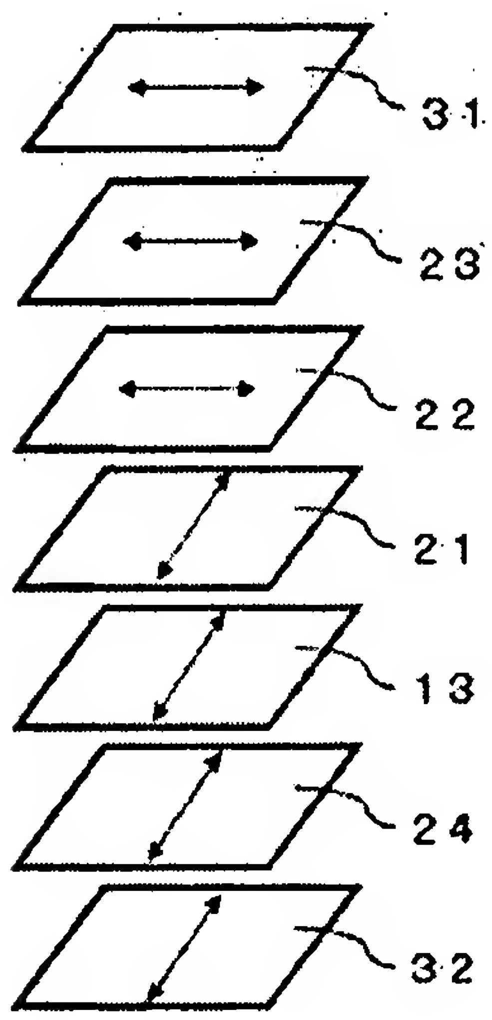

Fig. 11 in Declaration (equivalent to Fig. 4B of Itakura et al.)

liquid crystal layer 13
first optical compensator 21
second optical compensator 22
third optical compensator 23
fourth optical compensator 24
first polarizer 31
second polarizer 32

The results of the computer simulation for obtaining omni-directional contrast of EXAMPLE 1 OF FIRST EMBODIMENT is reported as Comparative Example 3 in the Declaration. In Table 2 of the Declaration, the results of the omni-directional contrast for Comparative Example 3 is reported as 55 or more and there was still a difference of at least about 10 as compared with the omni-directional contrast obtained in the liquid display device of Inventive Example 2 of the present invention which exhibited the smallest effect for improving contrast. As such, the surprising effect of the present invention is clearly shown by the Supplemental

Experiments.

In summary, the presently claimed invention is neither anticipated nor rendered obvious by Itakura et al. As such, withdrawal of the rejections is respectfully requested.

Conclusion

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen (Reg. No. 43,575) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

Dated: March 11, 2008

Respectfully submitted,

By ____________

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Enclosed: Declaration Under 37 C.F.R. 1.132